

Abstract of the Disclosure

A packet communication network is arranged so that a backpressure or feedback signal is sent from a receiving node to a node having packets to send to the receiving node, selectively allowing only certain packets to be considered eligible for transmission. The backpressure is arranged to be lossless, and to avoid network deadlocks and livelocks. The transmission of a packet p from a sending node X_ℓ to a receiving node R_ℓ , via a link ℓ , is controlled by (a) sending from the receiving node R_ℓ to the upstream node X_ℓ a feedback value f_ℓ that assures that there will be room in the buffer in the receiving node R_ℓ to store packets subsequently received from the upstream node X_ℓ ; (b) assigning a priority level λ_p to packets stored in the buffer of the receiving node R_ℓ ; and (c) transmitting from the sending node X_ℓ to the receiving node R_ℓ , only those stored packets at X_ℓ whose priority level λ_p exceeds the feedback value f_ℓ received from the receiving node R_ℓ . The assigning step can be accomplished by assigning a level that is less than or equal to D (the maximum number of hops that a packet must traverse through said network from node X_ℓ to node R_ℓ) minus the number of hops remaining between the receiving node R_ℓ and the destination, and is further arranged such that the priority level λ_p assigned to packets stored in the buffer at R_ℓ is based upon the destination to which the packets are to be transmitted, and is the same (referred to as λ^d) for all packets intended for the same destination. The feedback value f_ℓ sent from a receiving node R_ℓ to a sending node X_ℓ , which represents the lowest priority level of packets that the receiving node R_ℓ could accept without violating any of the B_i buffer threshold constraints, is determined by first setting in the buffer at the receiving node R_ℓ thresholds B_i that limit the maximum amount of space for packets with priority levels λ^d less than or equal to i . At all times, all B_i buffer threshold constraints must be satisfied. The receiving node R_ℓ thereafter monitors the priority levels λ^d of arriving and departing packets, and the increasing of priority levels λ_p of previously-stored packets (so that all packets destined for a given destination d have the same priority level λ^d), and thus keeps track of the total space in the buffer at R_ℓ occupied by packets of various priority levels λ^d .